

## CLAIMS

[Claim 1]

A negative-electrode material for lithium secondary battery, comprising a graphite-composite

5 mixture powder (C) that comprises:

a graphite composite powder (A) in which a graphite (D), whose aspect ratio is 1.2 or larger and 4.0 or smaller, is compounded with a graphite (E), which has orientation different from orientation of said

10 graphite (D); and

an artificial graphite powder (B).

[Claim 2]

A negative-electrode material for lithium secondary battery as defined in claim 1, wherein said

15 graphite (D) is a natural graphite.

[Claim 3]

A negative-electrode material for lithium secondary battery as defined in claim 1 or claim 2, wherein said graphite-composite mixture powder (C) has

20 a tap density of  $0.8 \text{ g/cm}^3$  or higher,

a BET specific surface area of  $1 \text{ m}^2/\text{g}$  or larger and  $5 \text{ m}^2/\text{g}$  or smaller, and

an interlayer spacing  $d_{002}$  between (002) planes of  $0.3360 \text{ nm}$  or smaller according to X-ray diffraction.

25 [Claim 4]

A negative-electrode material for lithium secondary battery as defined in any one of claims 1-3,

wherein said graphite composite powder (A) has an aspect ratio of 1.1 or higher and 4.0 or lower.

[Claim 5]

A negative-electrode material for lithium  
5 secondary battery as defined in any one of claims 1-4,  
wherein said graphite composite powder (A) has

a tap density of  $0.80 \text{ g/cm}^3$  or higher and  $1.35 \text{ g/cm}^3$  or lower,

a BET specific surface area of  $0.8 \text{ m}^2/\text{g}$  or larger  
10 and  $5.5 \text{ m}^2/\text{g}$  or smaller, and

a volume-based average particle diameter of  $6 \text{ }\mu\text{m}$   
or larger and  $80 \text{ }\mu\text{m}$  or smaller.

[Claim 6]

A negative-electrode material for lithium  
15 secondary battery as defined in any one of claims 1-5,  
wherein said artificial graphite powder (B) has

a BET specific surface area of  $0.3 \text{ m}^2/\text{g}$  or larger  
and  $3 \text{ m}^2/\text{g}$  or smaller, and

a volume-based average particle diameter of  $3 \text{ }\mu\text{m}$   
20 or larger and  $30 \text{ }\mu\text{m}$  or smaller.

[Claim 7]

A negative-electrode material for lithium  
secondary battery as defined in any one of claims 1-6,  
wherein the ratio of the amount of said graphite (D) to  
25 the amount of said graphite composite powder (A) is 30  
weight % or higher and 97 weight % or lower.

[Claim 8]

A negative-electrode material for lithium secondary battery as defined in any one of claims 1-7, wherein the ratio of the amount of said graphite composite powder (A) to the amount of said graphite-composite mixture powder (C) is 35 weight % or higher and 98 weight % or lower.

[Claim 9]

A negative-electrode material for lithium secondary battery as defined in any one of claims 1-8, wherein said graphite (E) and said artificial graphite powder (B) are made up of the same material.

[Claim 10]

A negative-electrode material for lithium secondary battery as defined in any one of claims 1-9, wherein said negative-electrode material further comprises a natural graphite powder (G), and the ratio of the amount of said graphite-composite mixture powder (C) to the total amount of said graphite-composite mixture powder (C) and said natural graphite powder (G) is 20 weight % or higher and 90 weight % or lower.

[Claim 11]

A negative-electrode material for lithium secondary battery as defined in any one of claims 1-10, wherein when an electrode with an electrode density of  $1.63 \pm 0.05 \text{ g/cm}^3$  is formed using said negative-electrode material as an active material, the orientation ratio of the active material is 0.07 or higher.

[Claim 12]

A negative-electrode material for lithium secondary battery as defined in any one of claims 1-11, wherein a lithium secondary battery produced using said negative-electrode material has a discharging capacity of 345 mAh/g or larger.

[Claim 13]

A method of producing a negative-electrode material for lithium secondary battery, comprising:

10        mixing pulverized matter of a graphite crystal precursor, which is obtained through heat treatment of a pitch material whose quinoline insoluble content is 3 weight % or lower, and graphite (D), whose aspect ratio is 1.2 or higher and 4.0 or lower and whose tap density is 0.7 g/cm<sup>3</sup> or higher and 1.35 g/cm<sup>3</sup> or lower;

15        carrying out heat treatment A on the mixture obtained from said mixing;

         pulverizing the product of said heat treatment A; and

20        carrying out heat treatment B on the product of said pulverizing.

[Claim 14]

A method of producing a negative-electrode material for lithium secondary battery, comprising:

25        preparing a graphite composite powder (A) from a pitch material, whose quinoline insoluble content is 3 weight % or lower, and a graphite (D), whose aspect

ratio is 1.2 or higher and 4.0 and whose tap density is 0.7 g/cm<sup>3</sup> or higher and 1.35 g/cm<sup>3</sup> or lower;

preparing an artificial graphite powder (B) from a pitch material; and

5 mixing the graphite composite powder (A) and the artificial graphite powder (B).

[Claim 15]

A negative electrode for lithium secondary battery, comprising:

10 a current collector; and

an active material layer formed on said current collector;

wherein said active material layer comprises a negative-electrode material for lithium secondary  
15 battery as defined in any one of claims 1-12.

[Claim 16]

A negative electrode for lithium secondary battery, comprising:

a current collector; and

20 an active material layer formed on said current collector;

wherein said active material layer comprises a negative-electrode material for lithium secondary battery produced by a production method as defined in  
25 claim 13 or claim 14.

[Claim 17]

A lithium secondary battery comprising:

a positive electrode and a negative electrode  
capable of intercalating and deintercalating lithium  
ions; and

an electrolyte;

5        wherein said negative electrode is a negative  
electrode for lithium secondary battery as defined in  
claim 15 or claim 16.